Russian Journal of General Chemistry 2009 vol.79 N7, pages 1473-1482

Electrochemical oxidation of tertiary phosphines in the presence of camphene

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Abstract

Anodic oxidation of tertiary phosphines (tripropyl-, tributyl-, and triphenylphosphine) in the presence of a bicyclic alkene (camphene) on a platinum and a glassy carbon electrodes was studied. For the first time the voltammetric characteristics of the process of camphene anodic oxidation were obtained. The electrochemical reactions with alkyl and aromatic phosphine were found to be dissimilar. The results of preparative electrooxidation of trialkylphosphines showed that in the course of electrolysis the tertiary phosphine cation-radicals generated on the anode enter into two concurrent reactions: (1) with the parent phosphine to form eventually trialkylphosphonium salts and trialkylphosphine oxides presumably as complex compounds and (2) with camphene to form trialkylcamphenylphosphonium salts and probably phosphonium salts with a monocyclic substituent. Preparative electrochemical oxidation of triphenylphosphine in the presence of camphene affords almost exclusively either triphenylphosphine oxide (in the experiment with platinum anode) or the triphenylphosphine oxide complex with perchloric acid (at the electrolysis on a glassy carbon anode).

http://dx.doi.org/10.1134/S1070363209070111